



Aspetti ecografici dei tumori in gravidanza

Prof. Antonia Carla Testa

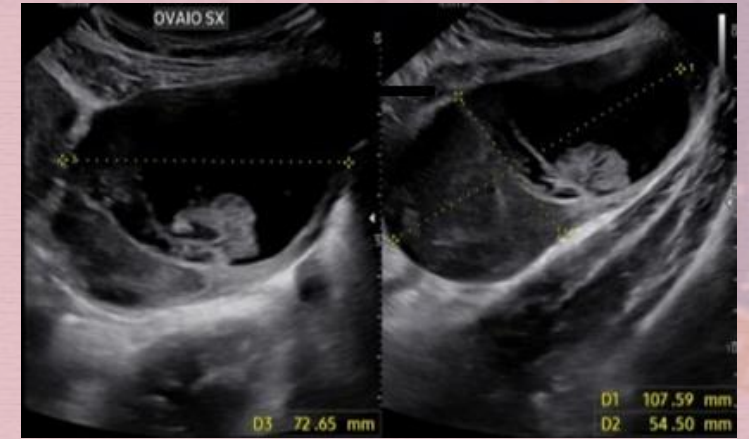
Dipartimento Scienze della Salute della Donna, del Bambino e di Sanità Pubblica
Fondazione Policlinico Universitario Agostino Gemelli, IRCCS, Rome, Italy



35 years old
Nulliparous

11 w

In the left adnexal region, a solid multilocular formation of 107x54x72 mm, with corpuscular content and irregular margins due to the presence of a moderately vascularized papilla of 14x25x20 mm



Solid multilocular formation of 69x49x61 mm in the right adnexal region, with corpuscular content and irregular margins due to the presence of numerous papillae, the largest of which of 14x17x14 mm, moderately vascularized



35 years old
Nulliparous

11 w

Solid lesion of mm 97x71x99 mm with regular margins, an inhomogeneous and poorly vascularized echo structure, which appeared fixed to and not separable from the sacrum.

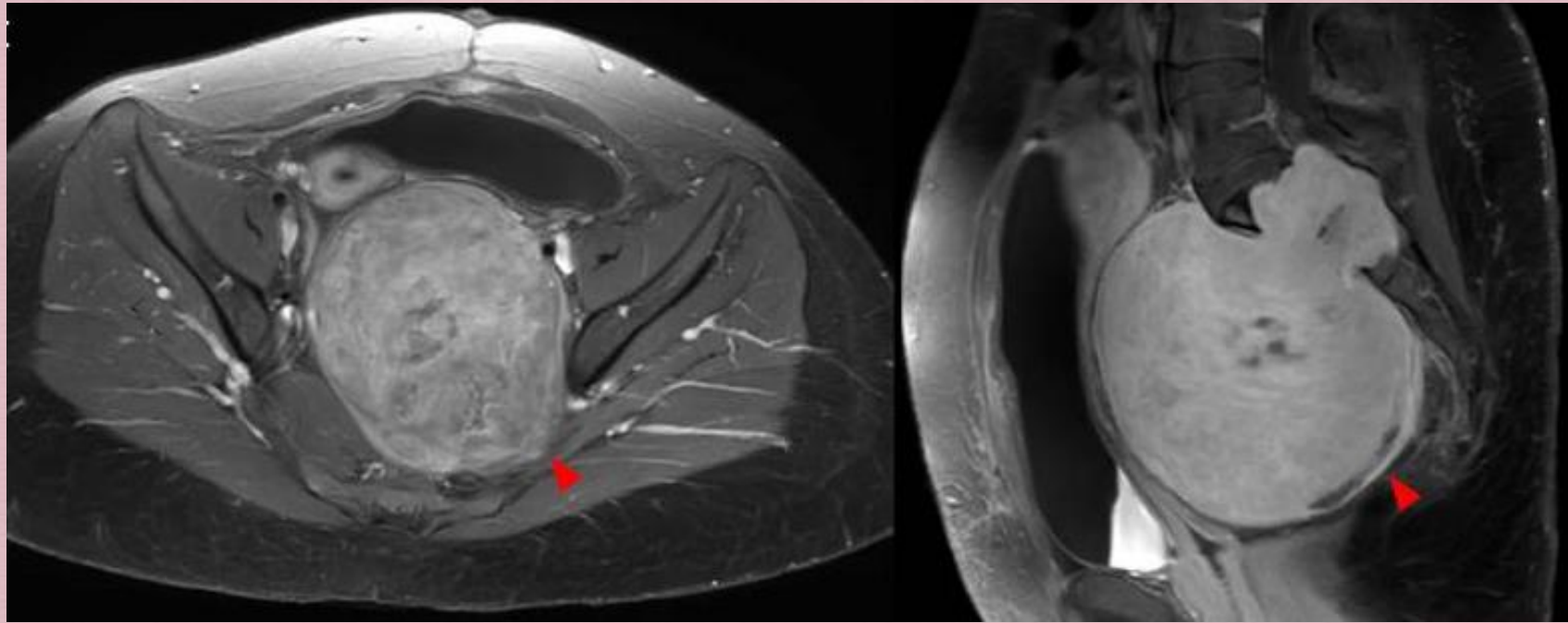




35 years old
Nulliparous



A voluminous (12x10 cm) solid tumor (arrowhead) deforming the uterus and extending into the spinal canal at sacral level





39 years old
Nulliparous

12 w



Laparotomy: right ovarian cystectomy, left salpingo-oophorectomy, omental biopsy and biopsy of presacral neoformation

Final histology report was positive for

Bilateral borderline sero-mucinous

Presacral Schwannoma



C-section at the 37th gestational week

Seven months later, neurosurgical removal was
successfully performed



36 years old
II pregnancy

7+6 w

Diagnosis of locally advanced squamous carcinoma of the cervix (LACC)

PET and MRI showed lymph node metastases (FIGO stage 2018 IIIC1p)

11+6 w

A Laparotomic bilateral systematic pelvic and para-aortic lymphadenectomy with peritoneal washing - *Squamous carcinoma FIGO stage 2018 IIIC1p*

14 w

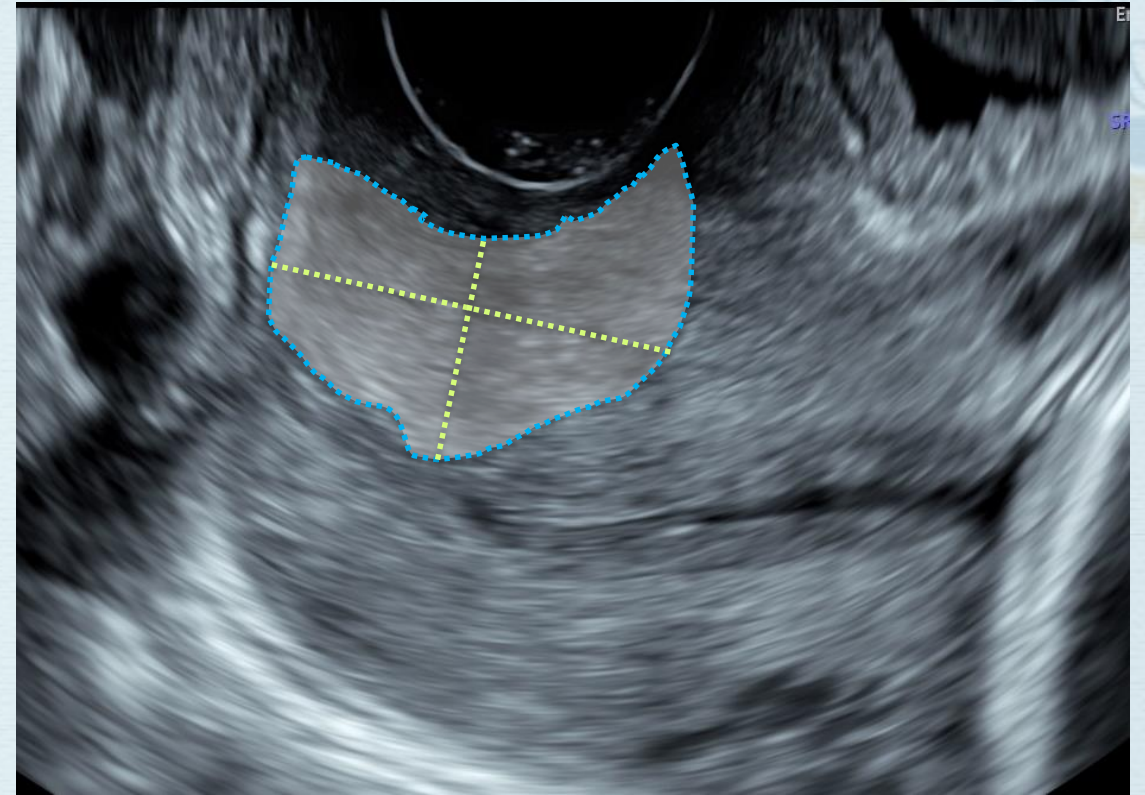
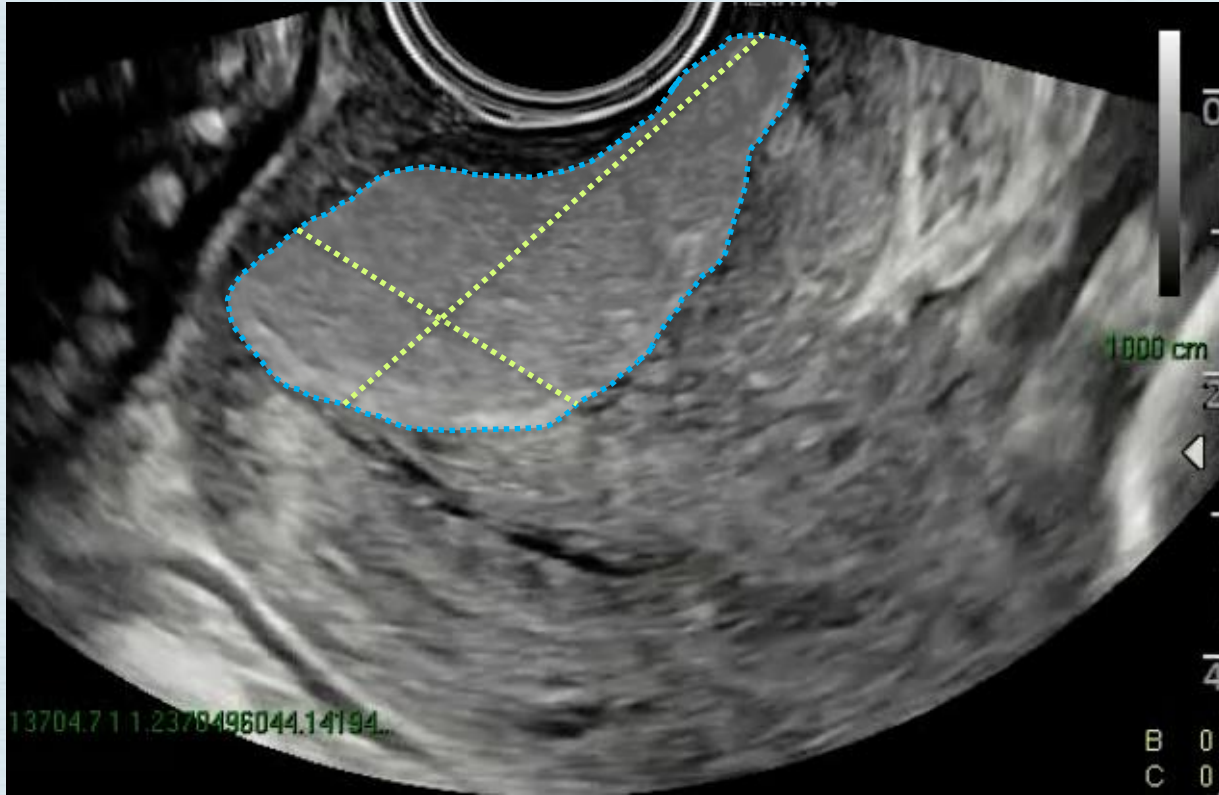
Neoadjuvant chemotherapy (NACT) with carboplatin plus taxol





36 years old
II pregnancy

24 w

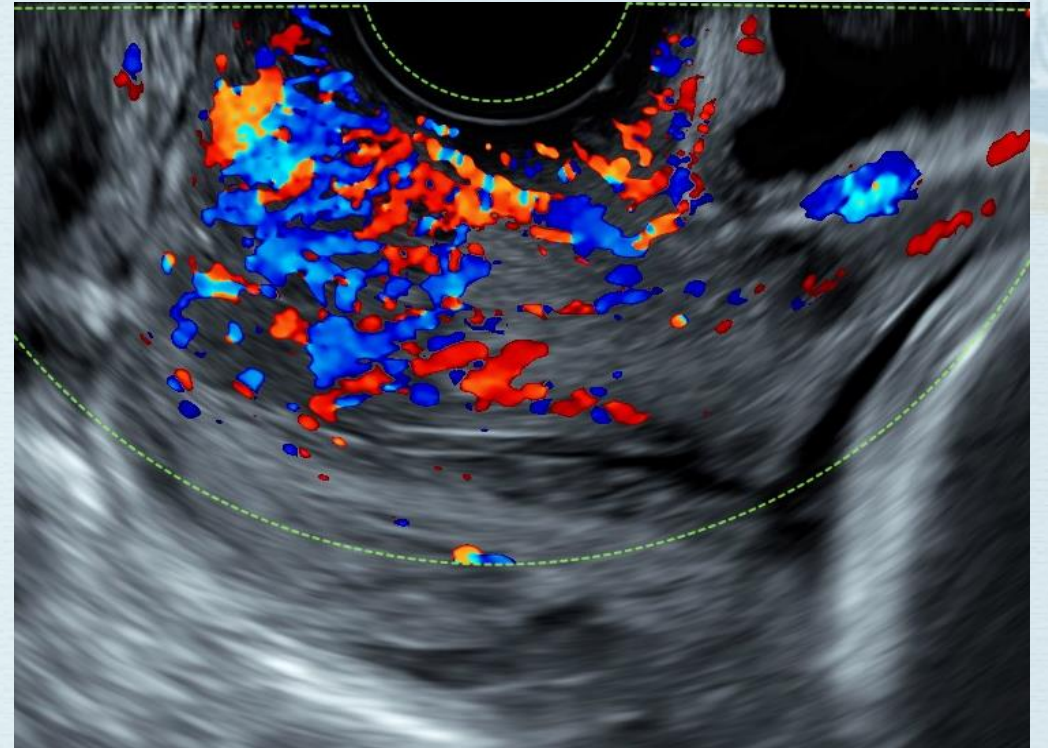
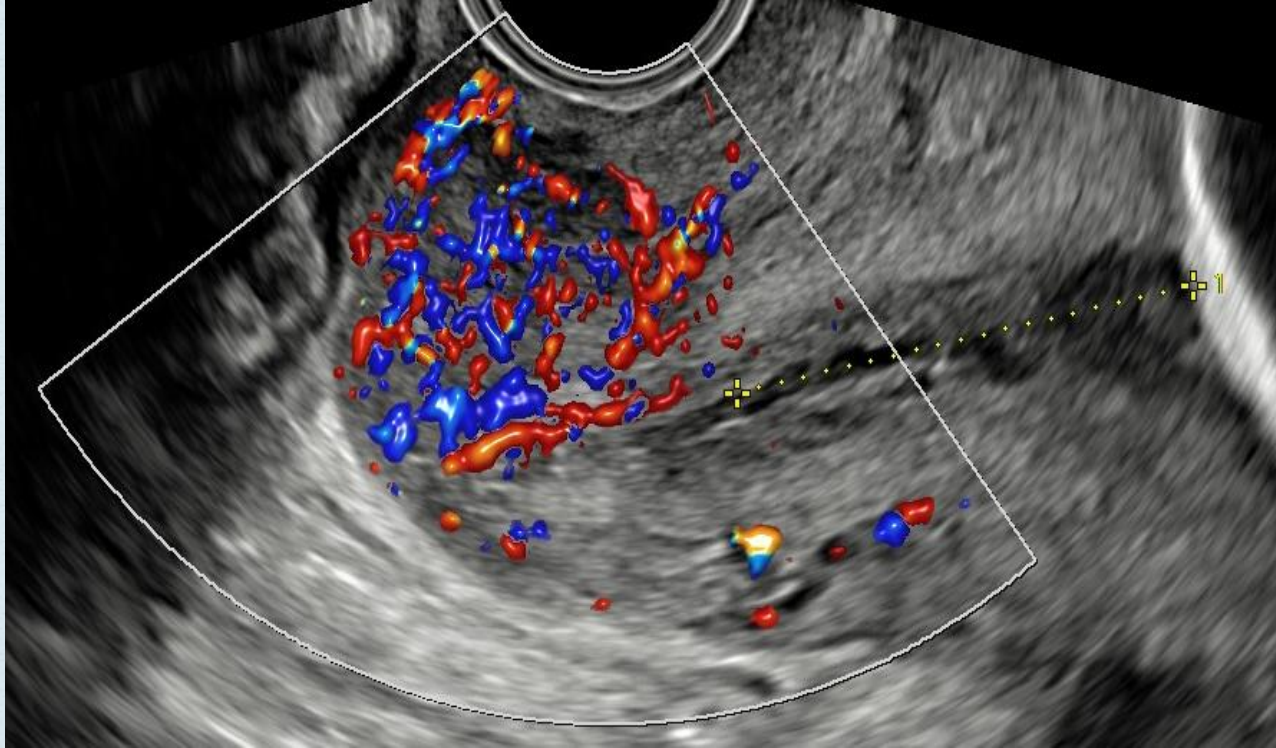


A hypoechoic cervical lesion, with irregular margins and homogeneous echostructure on the anterior lip of the cervix was showed



36 years old
II pregnancy

24 w



The lesion was richly vascularized at color Doppler



**36 years old
II pregnancy**



Cesarean section



**Radical hysterectomy class C1 according to Querleu–Morrow classification and
bilateral salpingoophorectomy**

**Final histological report was positive for squamous carcinoma of the
cervix locally advanced
FIGO Stage IIIC1**

The patient started RADIOCHEMOTHERAPY



2-10 %
1st
trimester

Ovarian masses

1-6 %
2nd
trimester



2-3% of invasive
tumors in
patients
operated during
pregnancy for
ovarian masses

Ovarian
carcinomas


1/12.500 -
1/25.000 of
pregnancies

How can we study pregnant patients with ovarian cysts?



OVARIAN MASSES IN PREGNANCY



	ADVANTAGES	DISADVANTAGES
 ULTRASOUND	Easy to perform Widely available Low cost No ionizing radiation Excellent screening tool	Operator dependent Some degree of expertise needed for interpretation Some masses may remain indeterminate





OVARIAN MASSES IN PREGNANCY



Ultrasound Obstet Gynecol 2004; 24: 578–580
Published online in Wiley InterScience (www.interscience.wiley.com). DOI: 10.1002/uog.1736

Sonographic features of decidualized ovarian endometriosis suspicious for malignancy

Ultrasound Obstet Gynecol. 2013 Sep;42(3):364-6.

Burkitt's lymphoma of the breast metastatic to the ovary diagnosed during pregnancy.

Color Doppler Sonographic Features of a Krukenberg Tumor in Pregnancy

Ultrasound Obstet Gynecol 2014; 44: 354–360
Published online in Wiley Online Library (wileyonlinelibrary.com). DOI: 10.1002/uog.13323

Imaging in gynecological disease (10): clinical and ultrasound characteristics of decidualized endometriomas surgically removed during pregnancy



2004, Fruscella et. al

2009, Testa et. al

2013, Mascilini et. al

2013, Mascilini et. al

ULTRASOUND
in Obstetrics & Gynecology



OVARIAN MASSES IN PREGNANCY



Ultrasound Obstet Gynecol 2017; 50: 116–123
Published online in Wiley Online Library (wileyonlinelibrary.com). DOI: 10.1002/uog.17216

ULTRASOUND
in Obstetrics & Gynecology

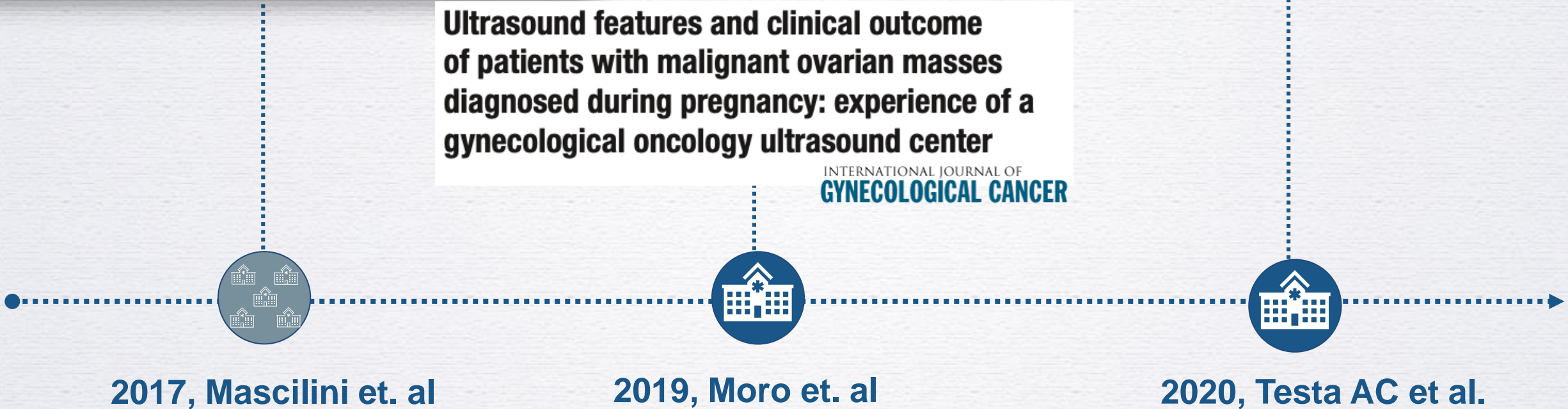
Ovarian masses with papillary projections diagnosed and removed during pregnancy: ultrasound features and histological diagnosis

Management of ovarian masses in pregnancy: patient selection for interventional treatment

INTERNATIONAL JOURNAL OF
GYNECOLOGICAL CANCER

Ultrasound features and clinical outcome of patients with malignant ovarian masses diagnosed during pregnancy: experience of a gynecological oncology ultrasound center

INTERNATIONAL JOURNAL OF
GYNECOLOGICAL CANCER



OVARIAN MASSES IN PREGNANCY

A thick blue line graphic that starts as a vertical line on the left, then angles upwards to the right, then angles downwards to the right, and finally continues as a horizontal line across the top of the slide.

What
have we
learned?

A yellow signpost with a wooden post and two horizontal signs. The top sign is blank, and the bottom sign is an arrow pointing to the right.

WHAT HAVE WE LEARNED?



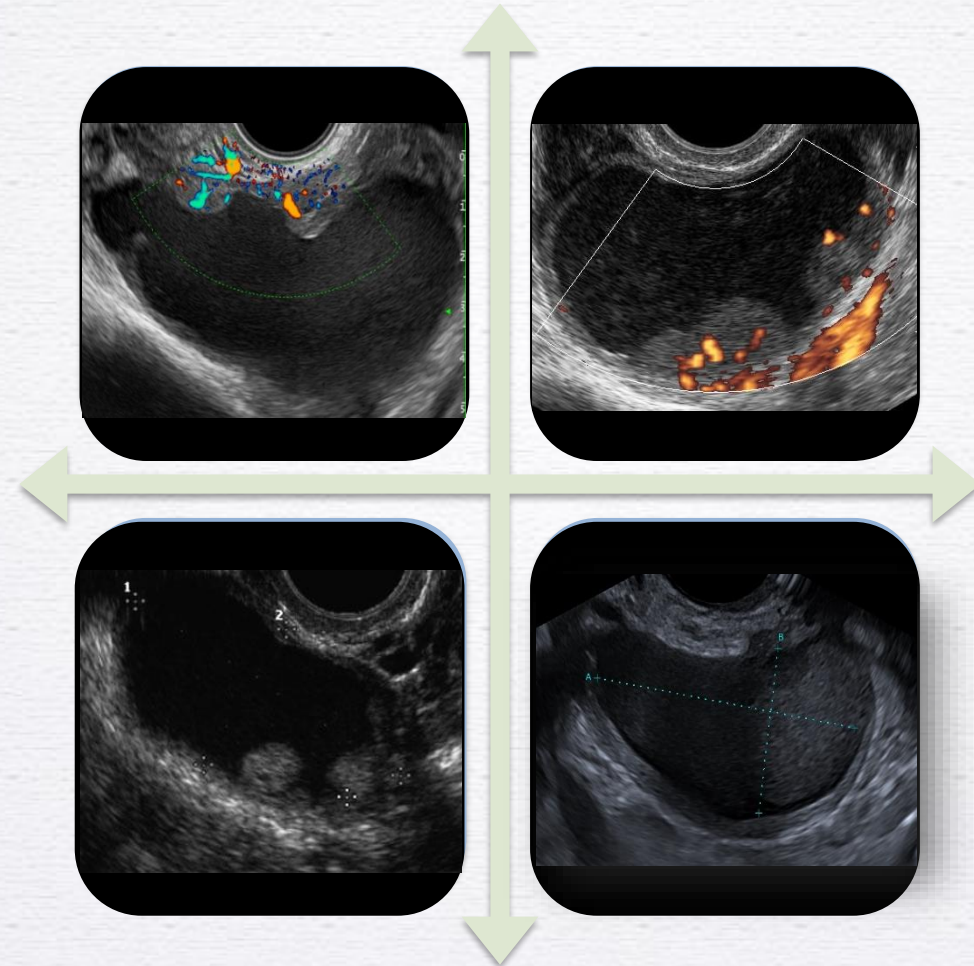
- 1 Ovarian endometrioma changes during pregnancy
- 2 Endometriotic nodules change during pregnancy
- 3 Ovarian cystadenofibromas in pregnant women are similar to those described in non-pregnant patients
- 4 Borderline ovarian tumors usually don't change during pregnancy
- 5 Solid tumors are suspicious for malignancy



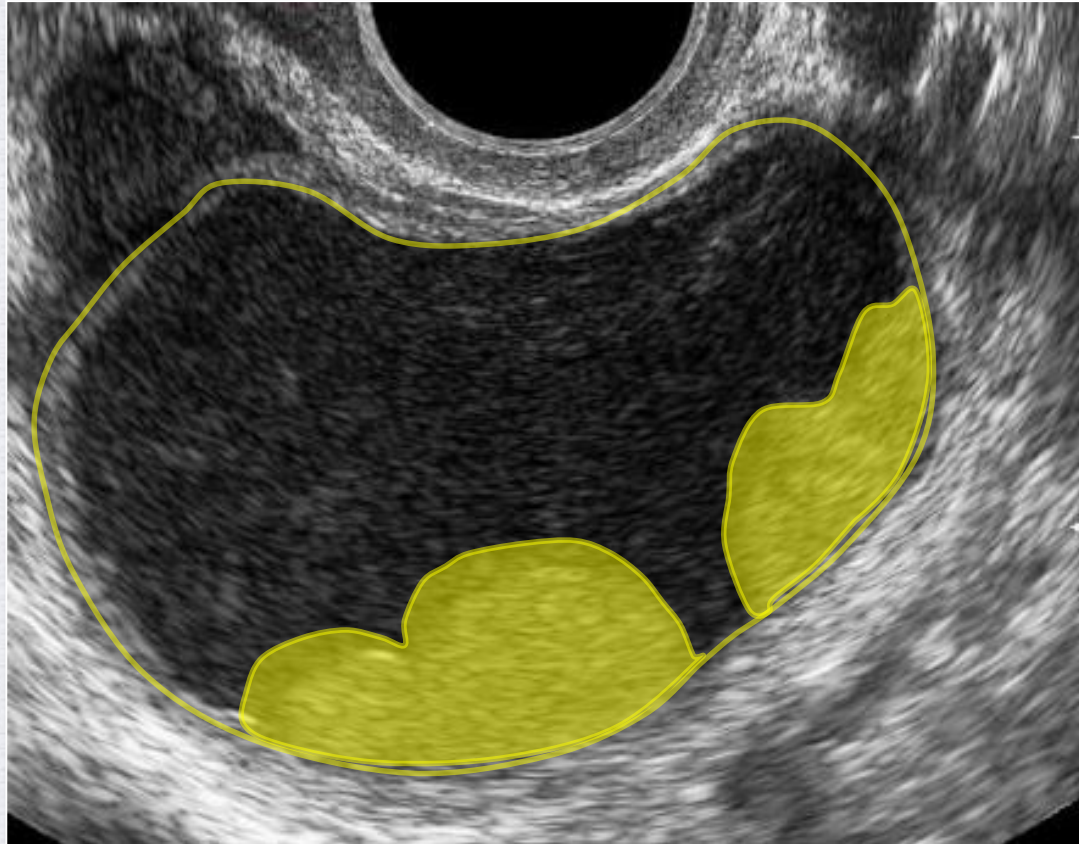
1

WHAT HAVE WE LEARNED?

Ovarian endometrioma changes during pregnancy

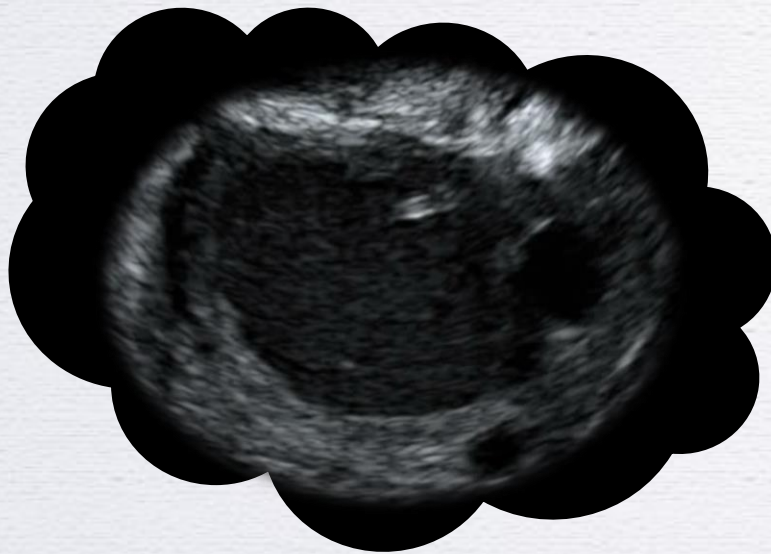


“Rounded Vascularized Papillation with Smooth Surface”





Unilocular-solid, ground glass...



...US scan before pregnancy with a diagnosis of endometrioma...





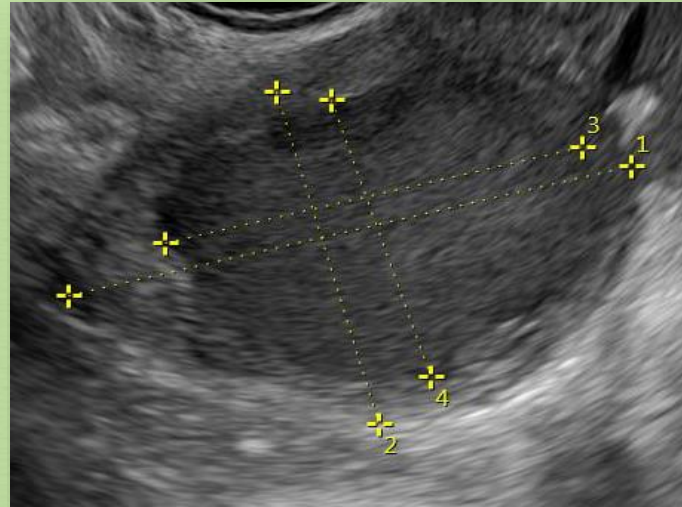
CLINICAL CASE 1

CLINICAL CASE 1

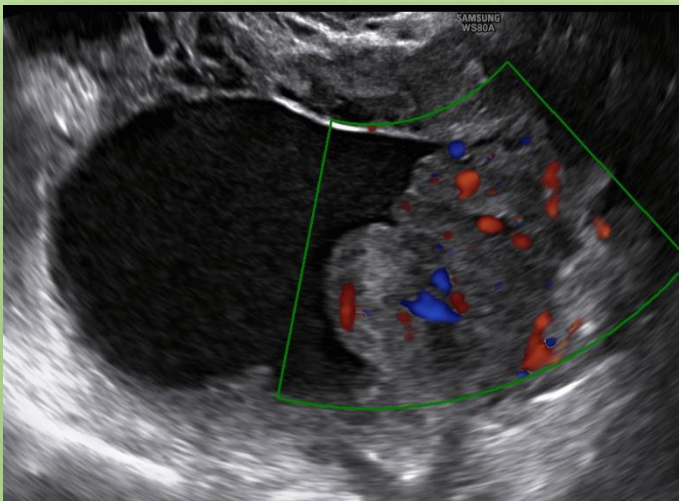


D.S.
24 years old
Nulliparous

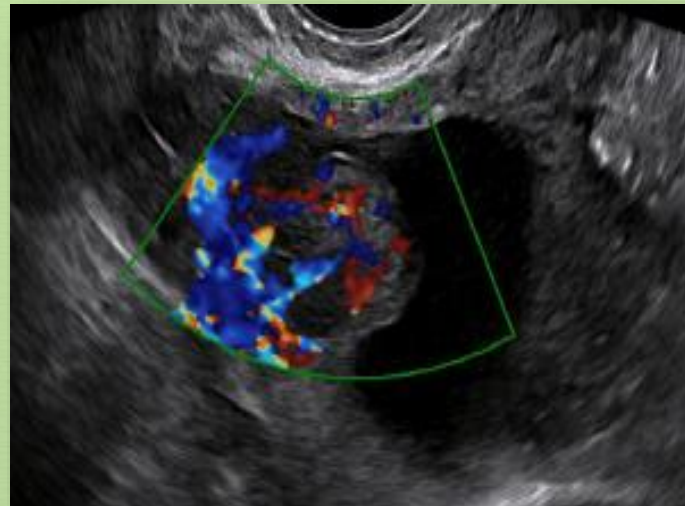
Before pregnancy



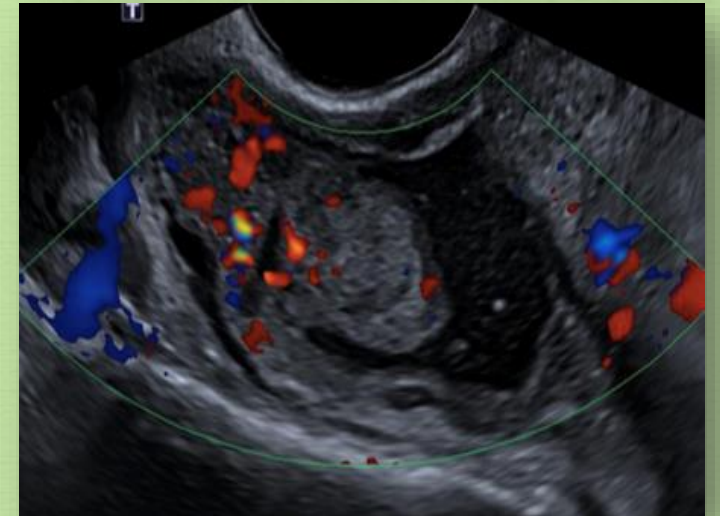
12 weeks



24 weeks

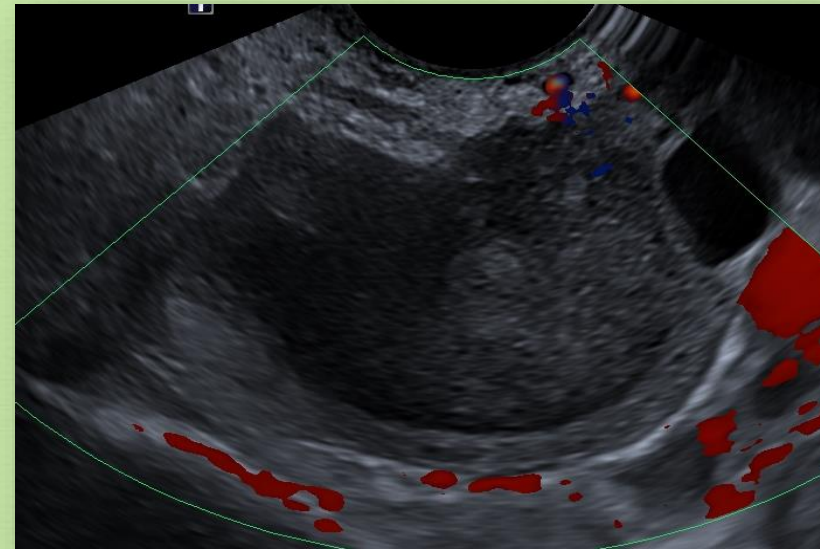
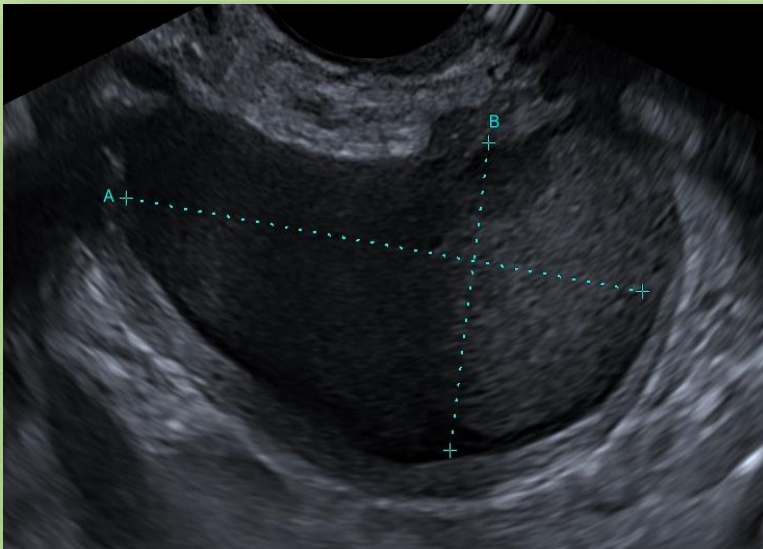


37 weeks



CLINICAL CASE 1

Post partum



Endometrioma



2

WHAT HAVE WE LEARNED?

Endometriotic nodules change during pregnancy

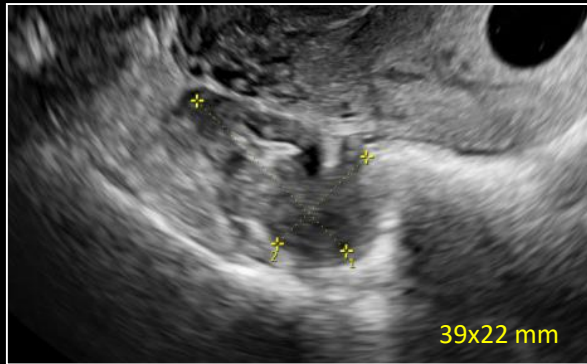
Endometriotic nodules appear to change during pregnancy.

They become more vascularized after 12 weeks of pregnancy.

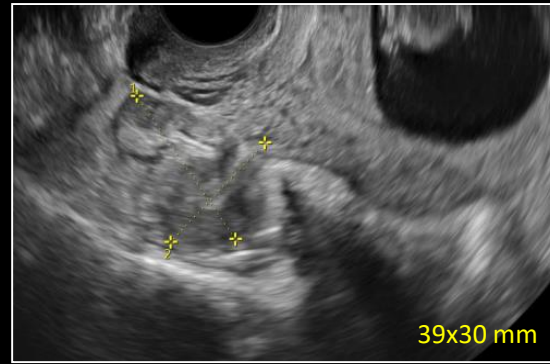
After delivery, endometriotic nodules reduce in size and in vascularization.

Endometriotic nodules

8 weeks



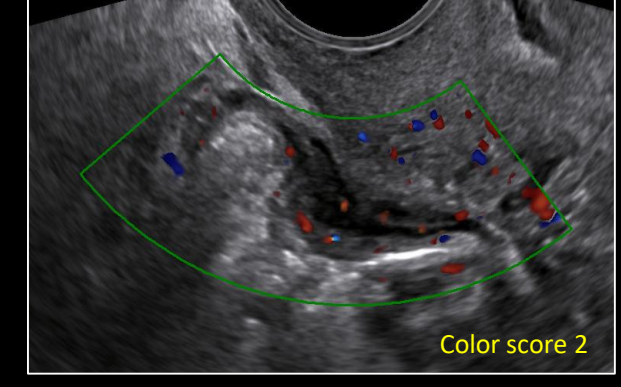
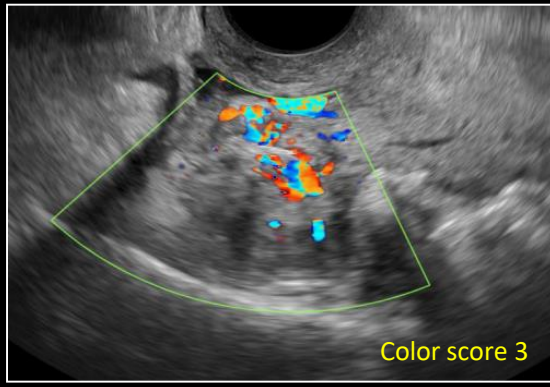
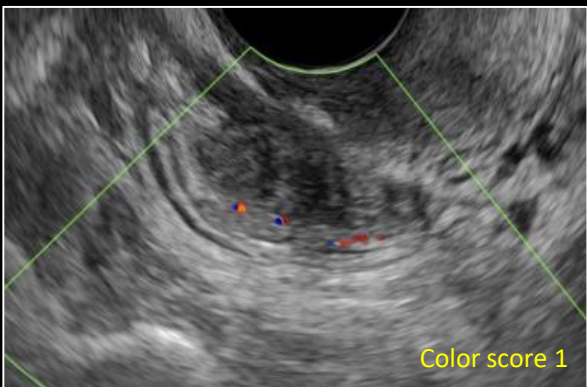
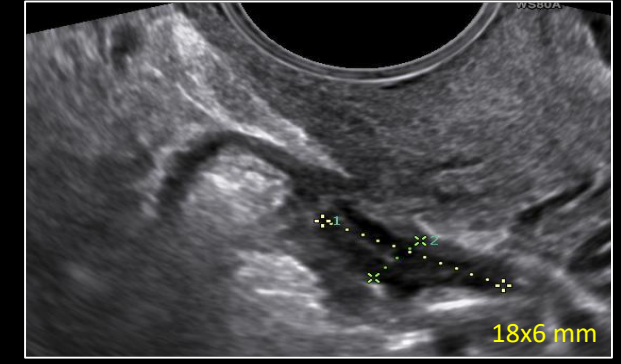
12 weeks



24 weeks



After pregnancy

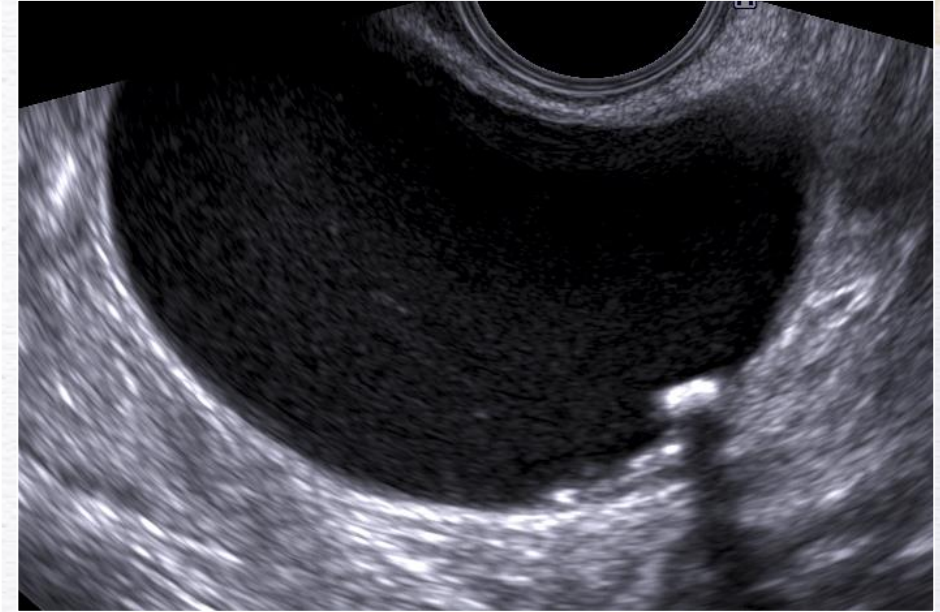
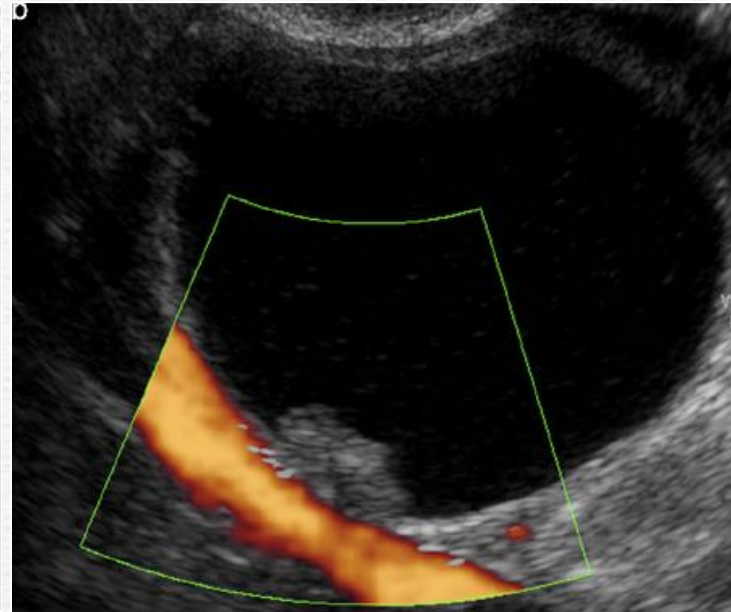
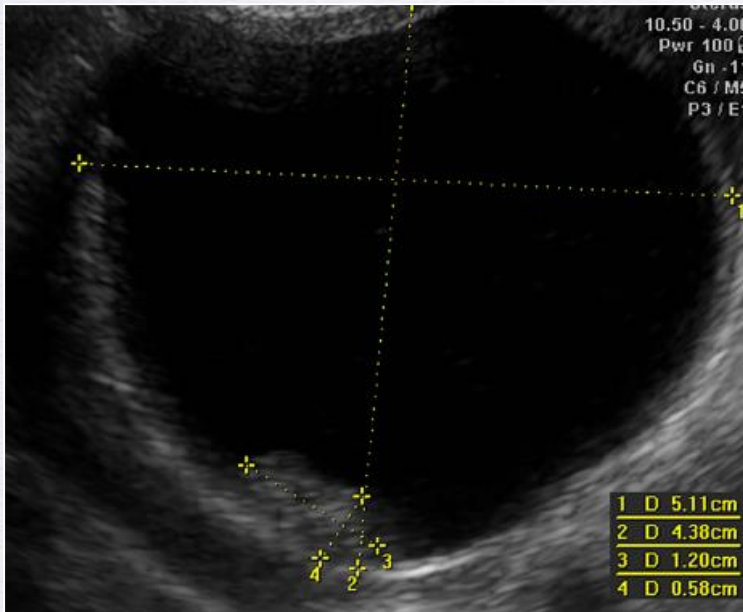




3

WHAT HAVE WE LEARNED?

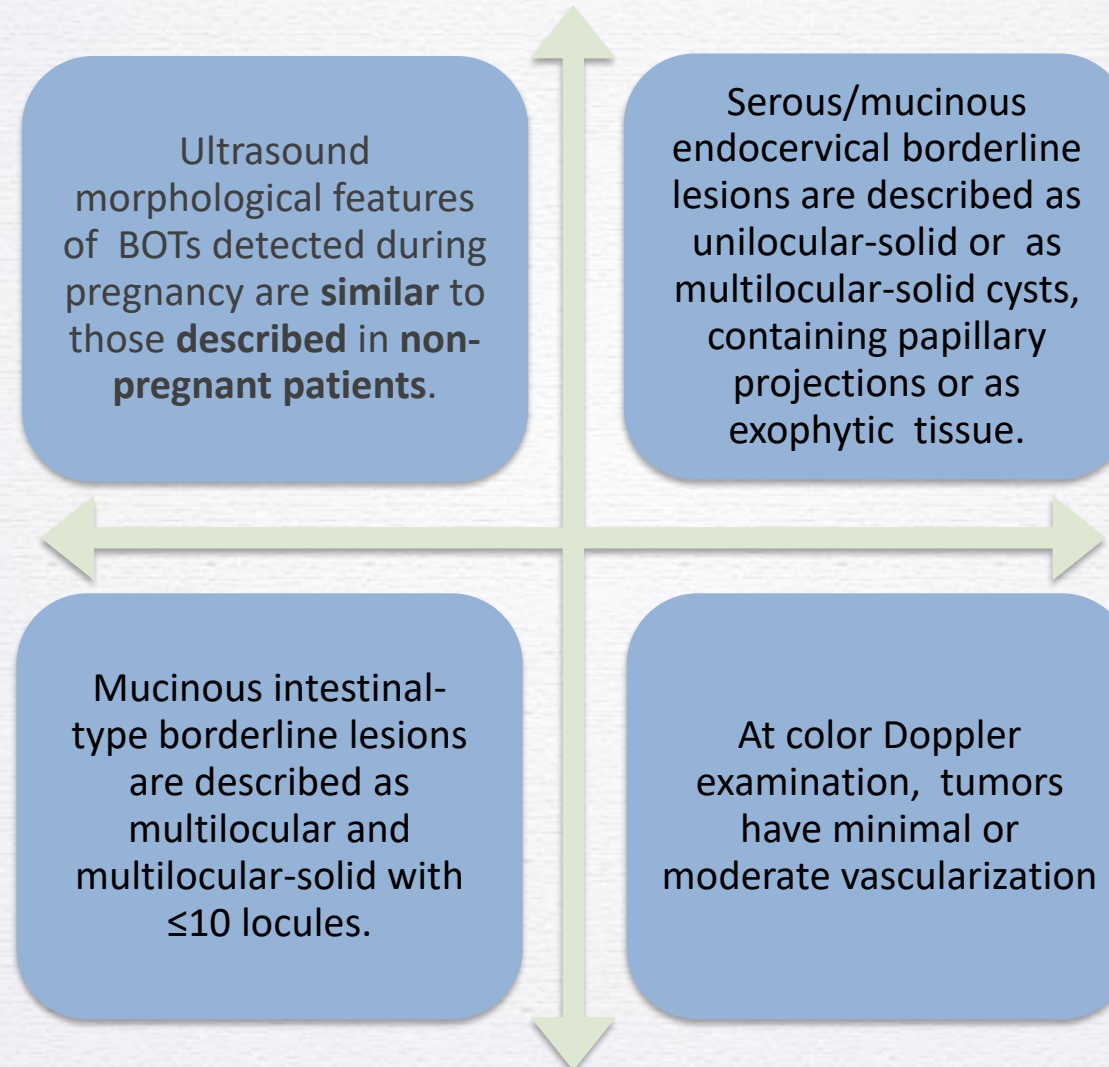
Ovarian cystadenofibromas in pregnant women are similar to those described in non-pregnant patients



4

WHAT HAVE WE LEARNED?

Borderline ovarian tumors usually don't change during pregnancy.



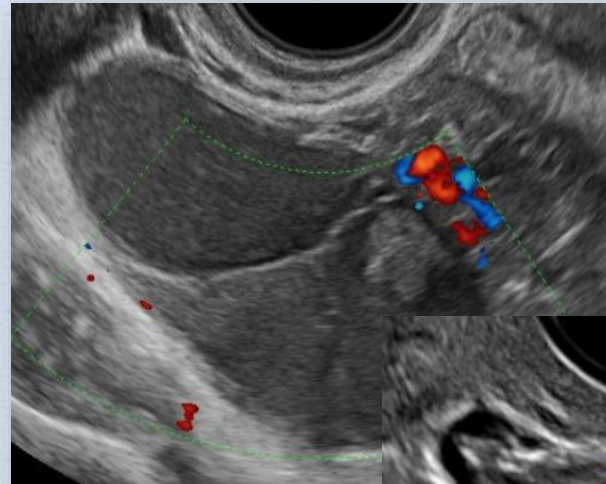


CLINICAL CASE 2

CLINICAL CASE 2

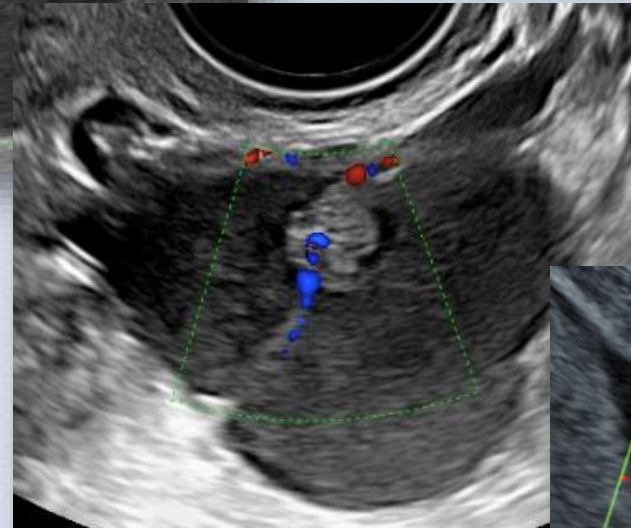


M.G.M.
28 years old
Nulliparous



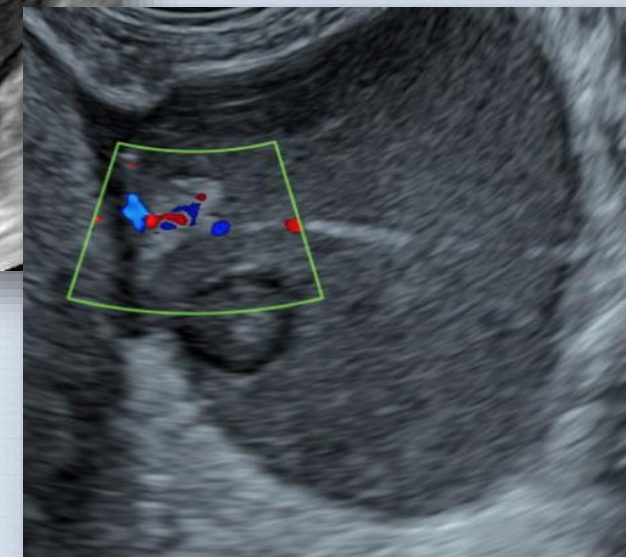
8 weeks

54x31x39 mm
7x9 mm



24 weeks

54x34x61 mm
7x10 mm



Post partum

56x47x40 mm
6x8 mm

Mucinous endocervical type BOT

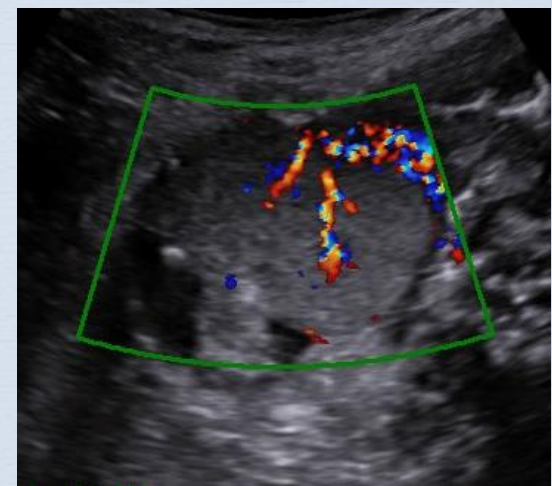
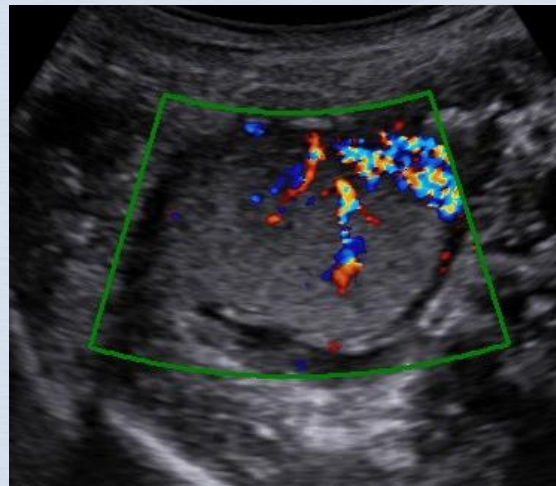
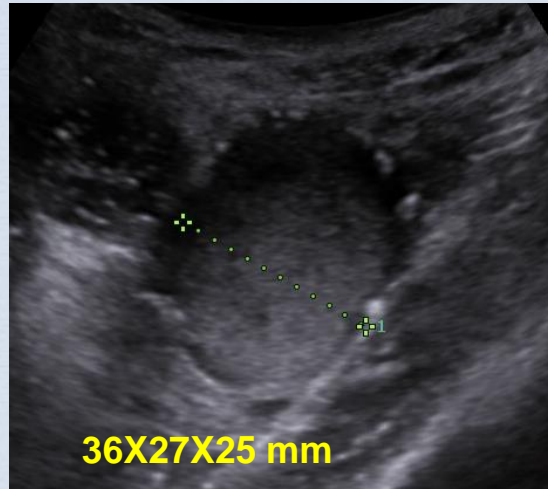


CLINICAL CASE 3



M.G.
27 years old
Nulliparous

17 weeks



Serous borderline ovarian tumor



WHAT HAVE WE LEARNED?

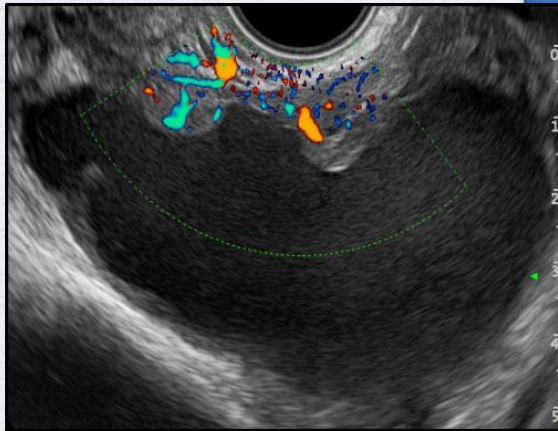
Cysts with papillations
with a smooth contour

...Cysts with papillations
with an irregular
contour

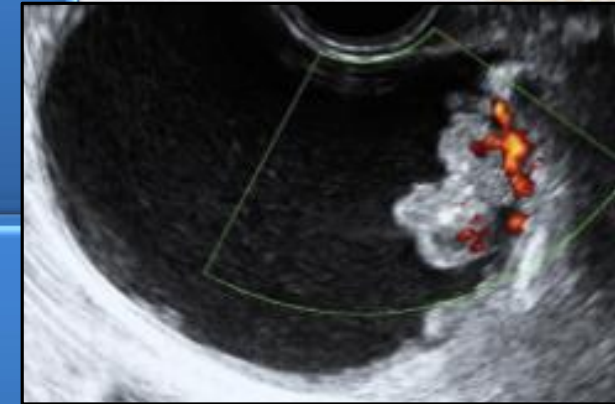
Unilocular cyst with
papillations but not
other solid component

Ground-glass
echogenicity

Anechoic or low-level
echogenicity



Decidualized
endometrioma



Serous BOT





5

WHAT HAVE WE LEARNED?

Solid tumors are suspicious for malignancy

The risk of malignancy in non-pregnant patients is **60%**.

Ovarian fibromas are benign solid tumors, but the mean age at diagnosis is **48 years**.

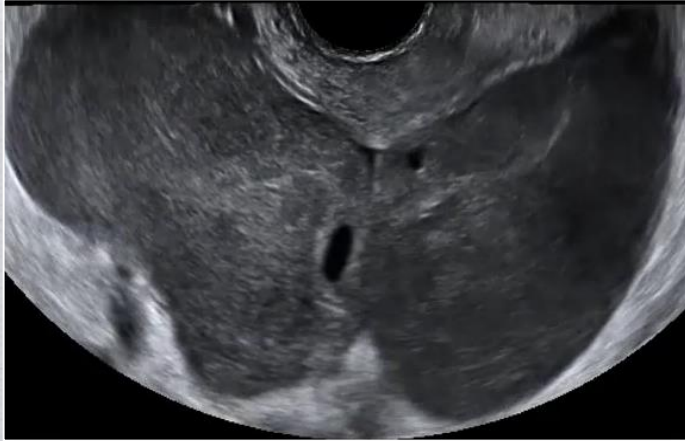
The risk of **malignancy in pregnant patients** is significant.



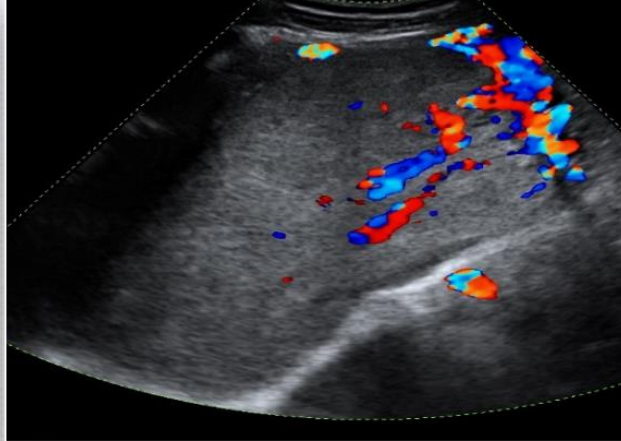
CLINICAL CASE 4

WHAT HAVE WE LEARNED?

Lymphoma



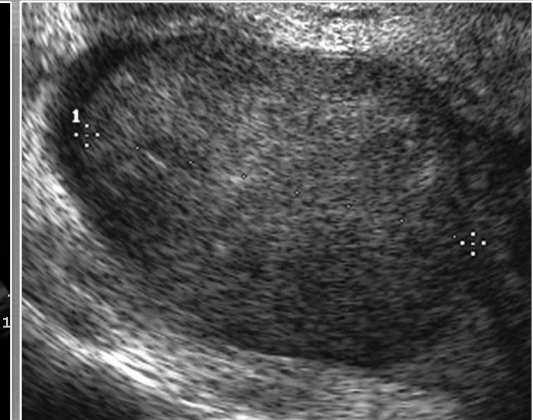
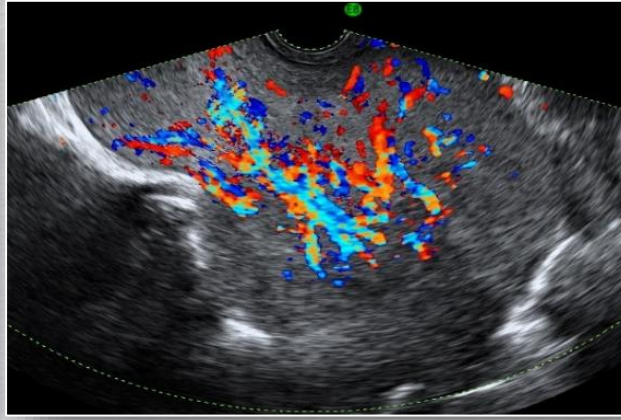
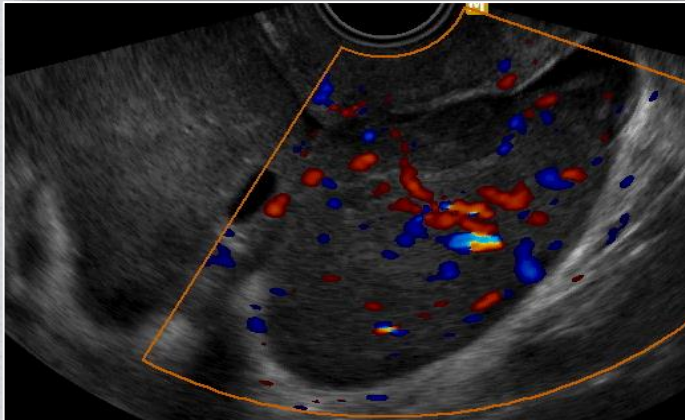
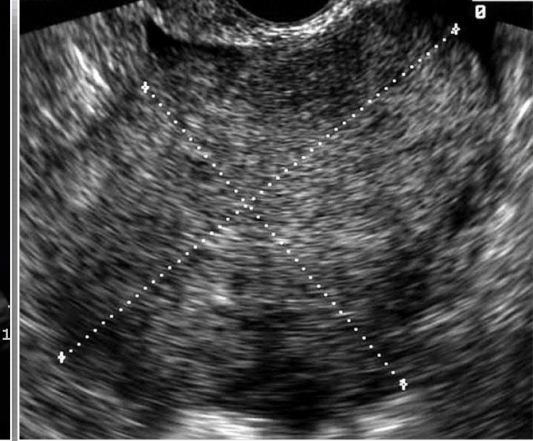
Krukenberg tumor



Metastases from small cell lung carcinoma

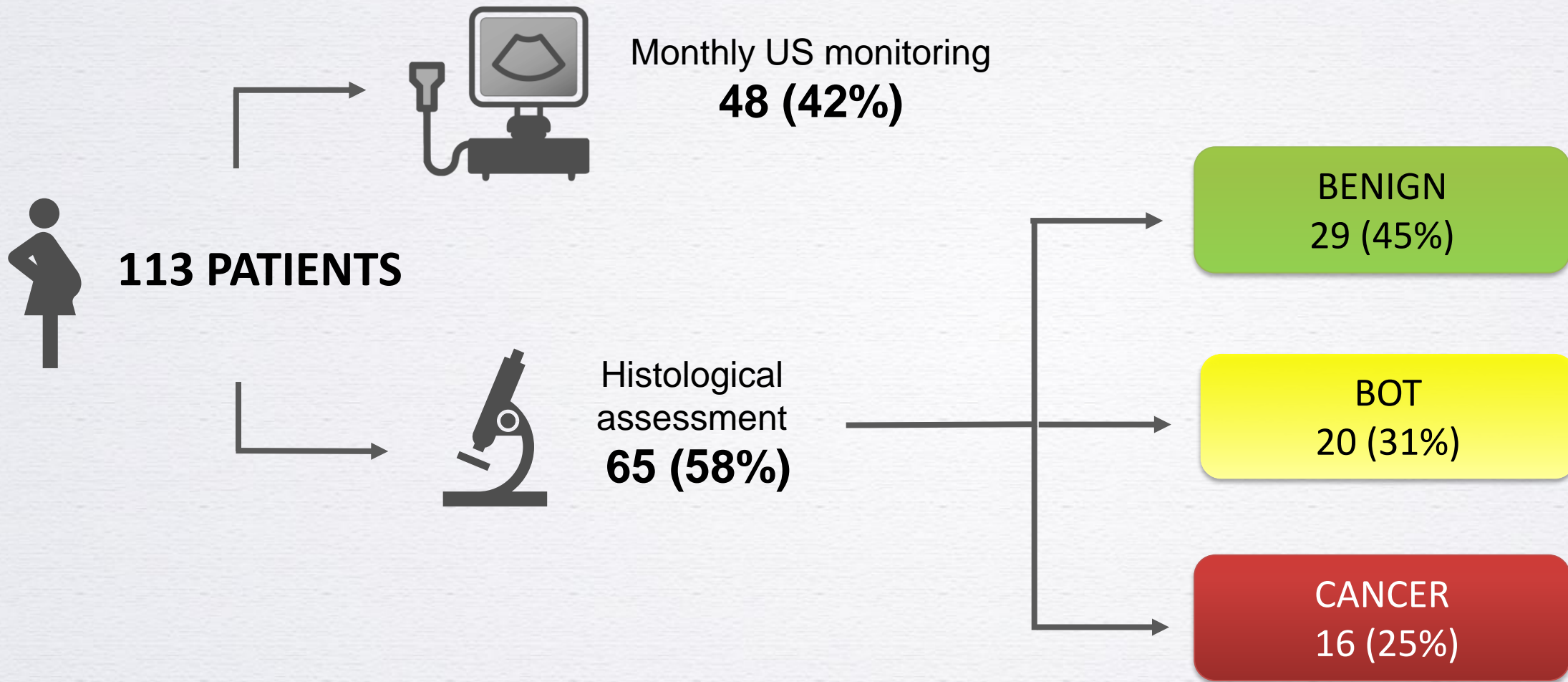


Metastases from breast Cancer



How can we counsel pregnant patients with ovarian cysts?





**Management of ovarian masses in pregnancy:
patient selection for interventional treatment**



Ovarian cyst in pregnancy

- Torsion
- Pelvic pain
- Mass effect

Symptomatic



Surgery at any gestational age (possibly after 12 weeks)

Asymptomatic



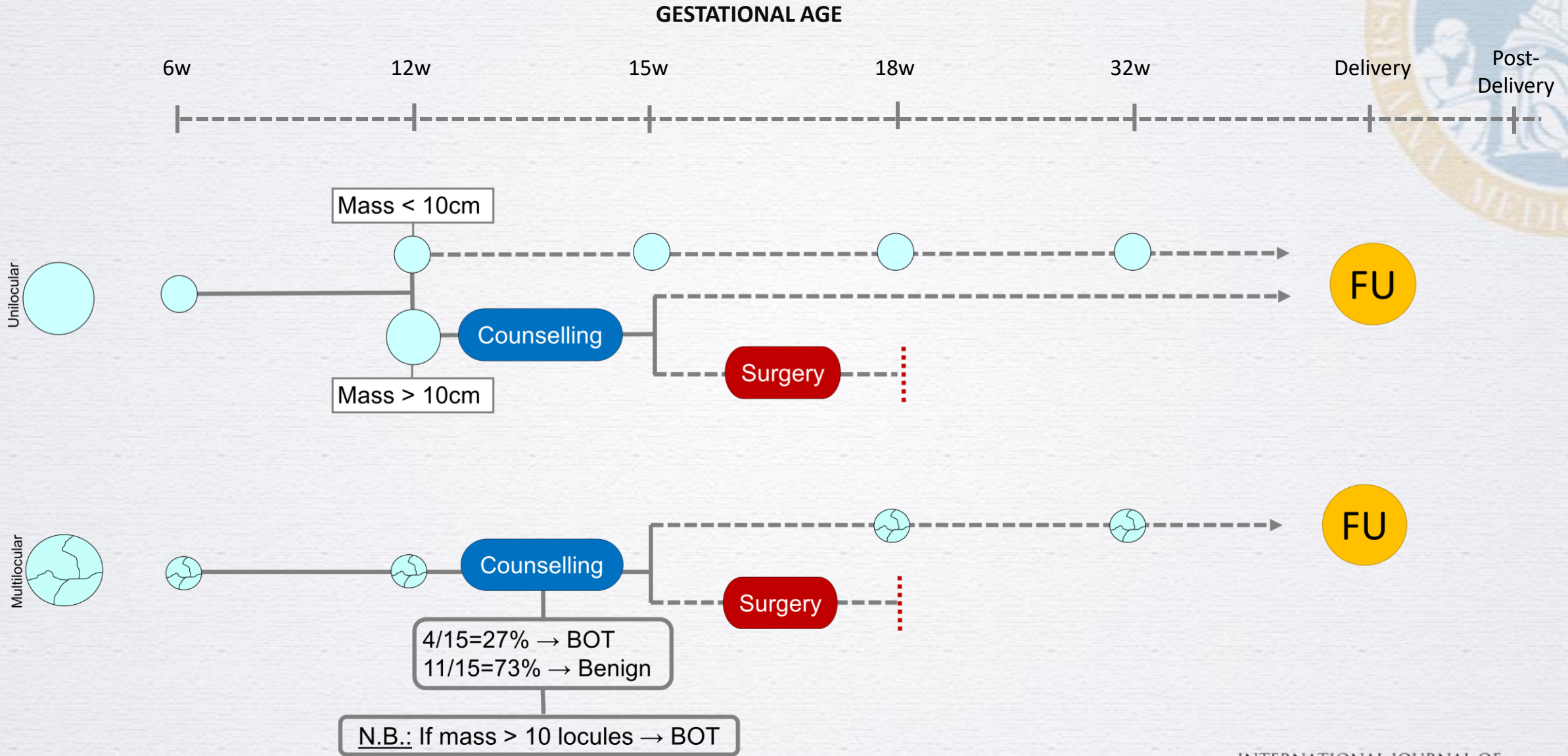
Ultrasound follow up



Surgery (possibly between 12-18 weeks)

MORPHOLOGIC ULTRASOUND EVALUATION

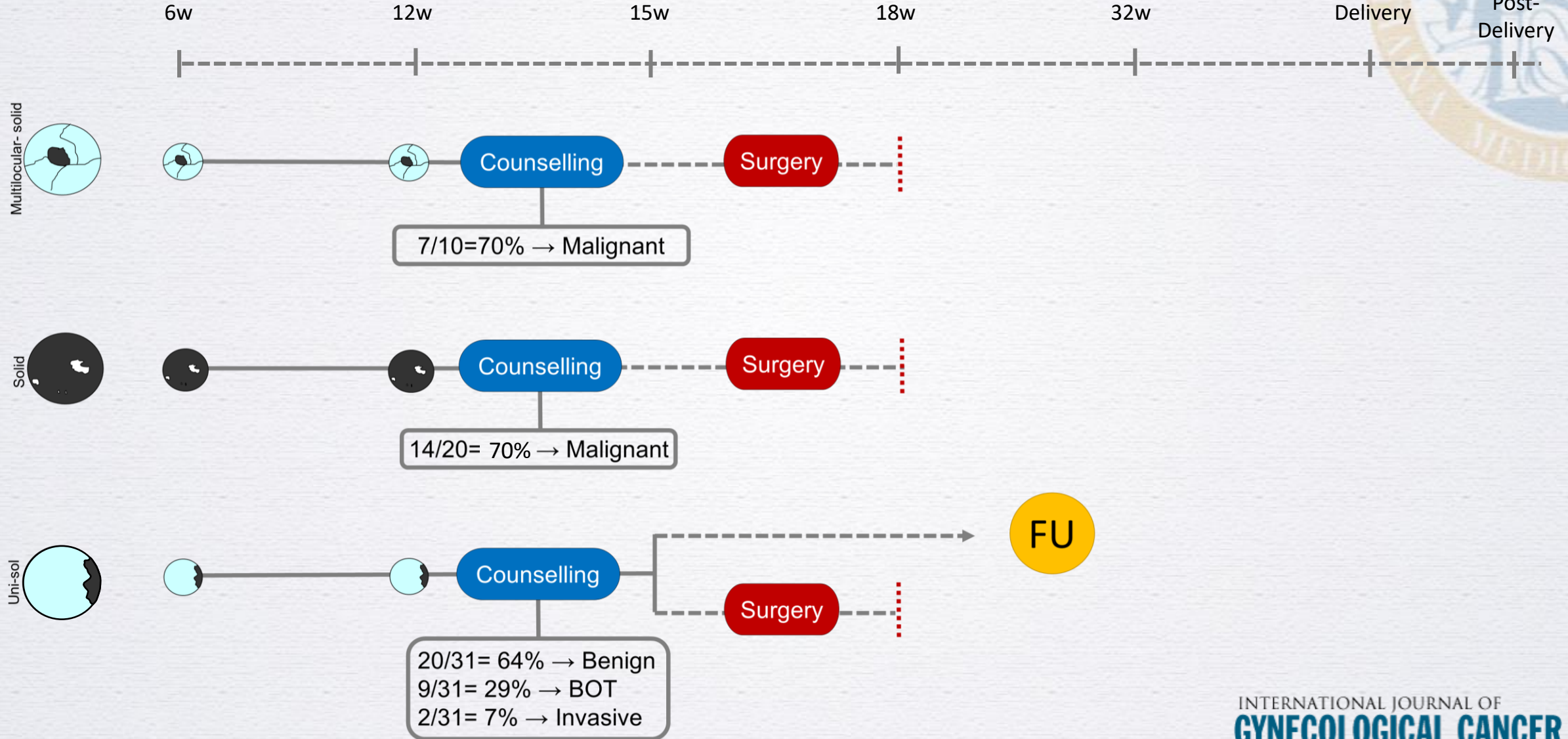
MORPHOLOGY



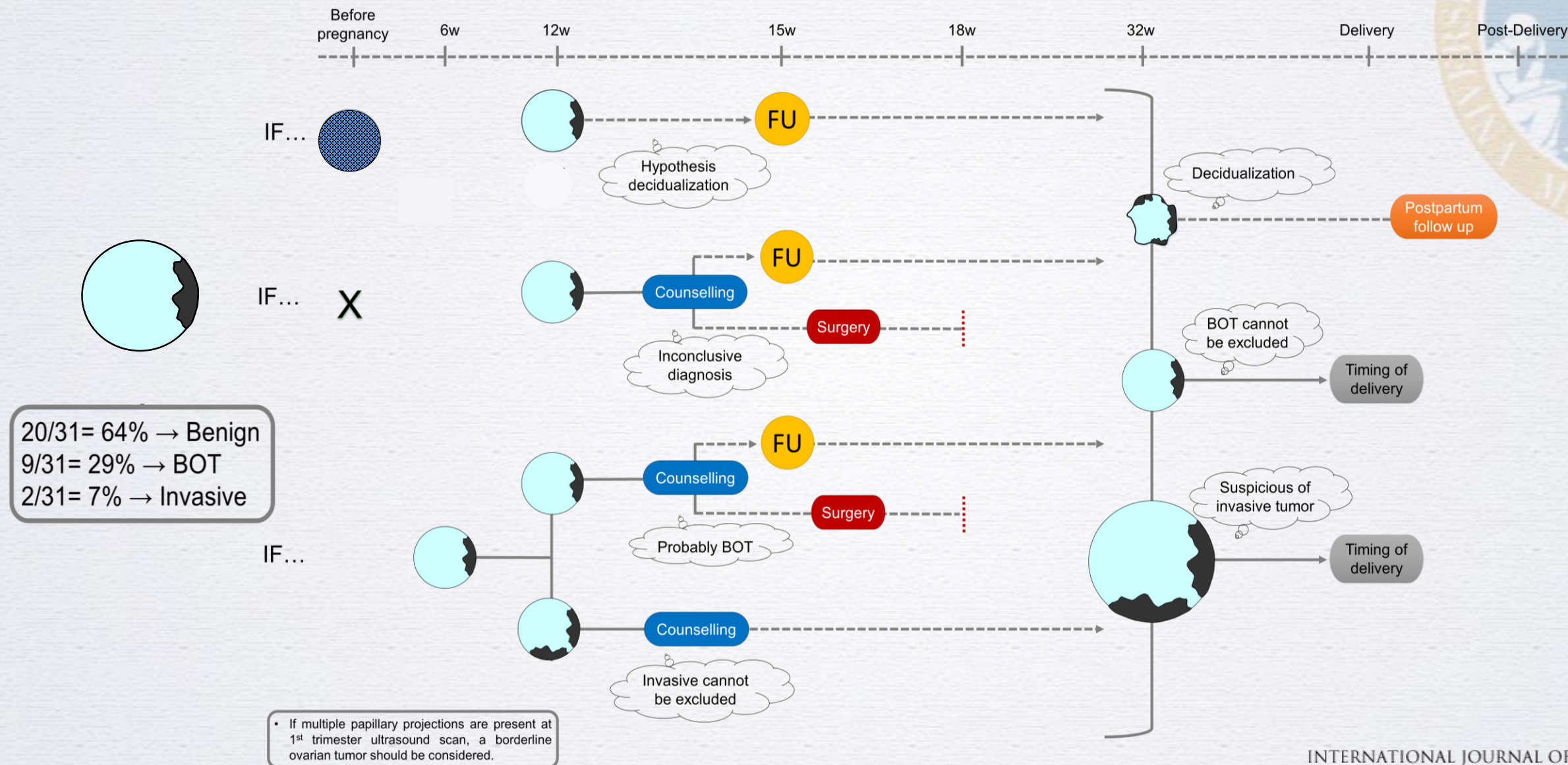
MORPHOLOGIC ULTRASOUND EVALUATION

MORPHOLOGY

GESTATIONAL AGE



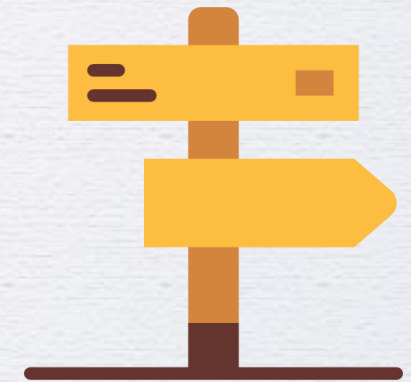
US ASSESSMENT UNILOCULAR SOLID MASS



OVARIAN MASSES IN PREGNANCY



What can
we still
learn?



WHAT CAN WE STILL LEARN?



How is the prevalence of invasive cancer in unilocular solid cysts?

How to manage a suspicion of cancer at the very beginning of pregnancy?

How to diagnose a multilocular cyst during pregnancy?

What is the accuracy of IOTA Model during pregnancy?



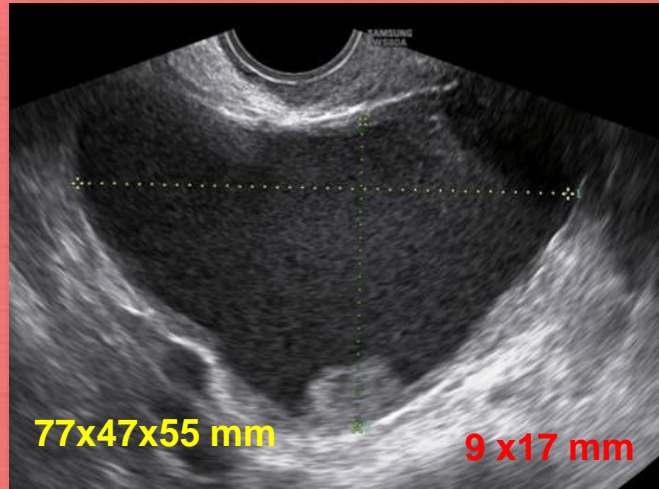


CLINICAL CASE 5

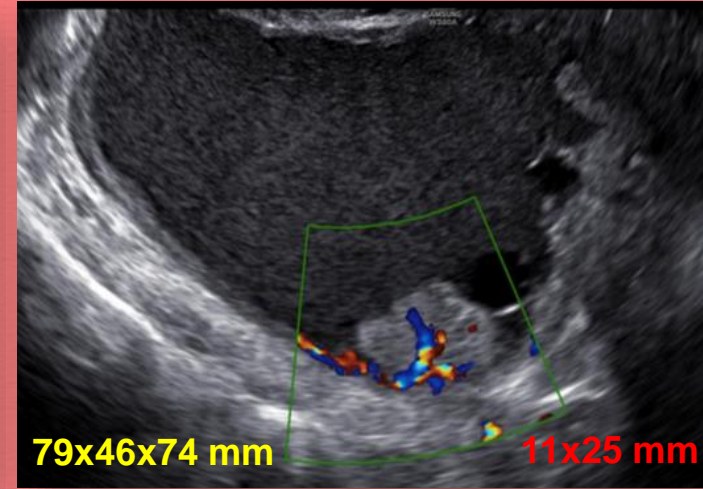
CLINICAL CASE 5



B.C.
42 years old
Nulliparous



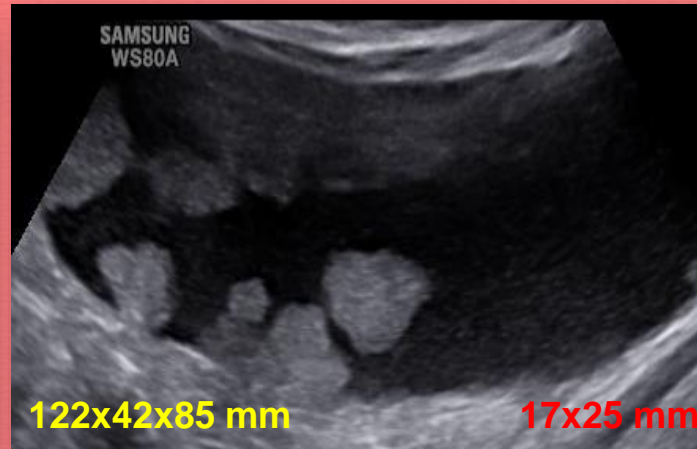
14 weeks



19 weeks



25 weeks



37 weeks



CLINICAL CASE 5

Post-partum



Clear cell ovarian cancer FIGO Stage I

WHAT CAN WE STILL LEARN?



How is the prevalence of invasive cancer in unilocular solid cysts?

How to manage a suspicion of cancer at the very beginning of pregnancy?

How to diagnose a multilocular cyst during pregnancy?

What is the accuracy of IOTA Model during pregnancy?



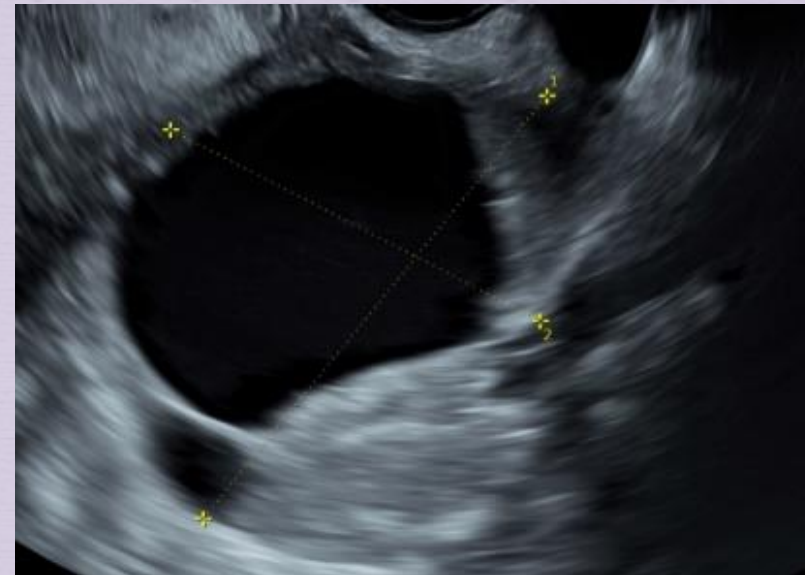
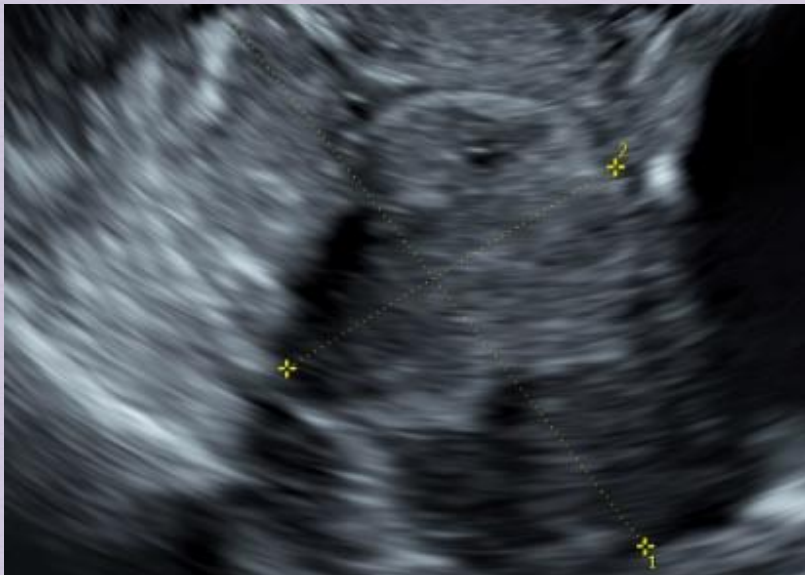
CASE REPORT

6 w

Multilocular solid left adnexal mass of mm 90x67x81 with a solid component of mm 49x50x31, with moderate vascularization



33 years old
Nulliparous

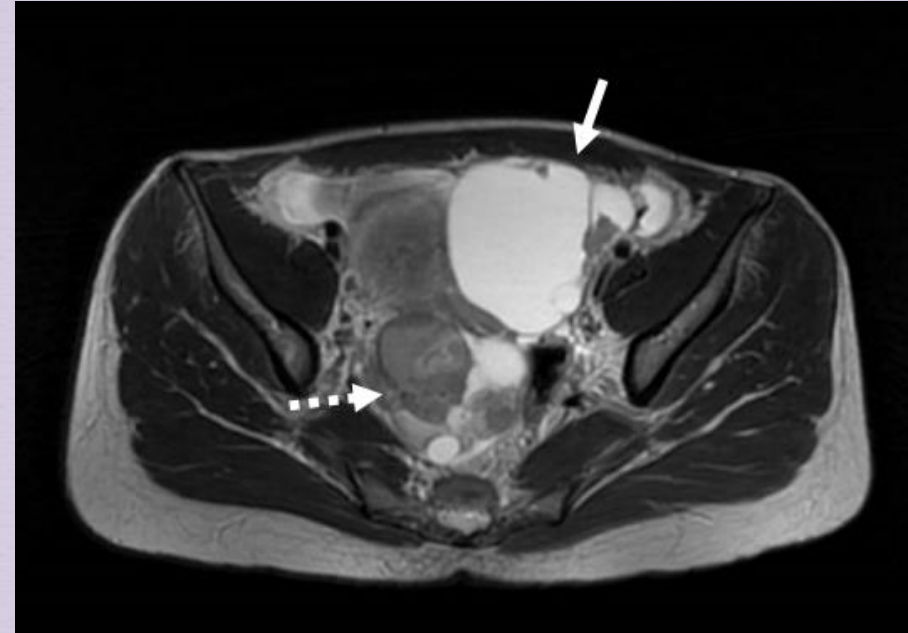


Right ovary was replaced by an irregular solid mass of 74x40x61 mm with four vascularized papillary projections with a maximum height of 24 mm protruding into an internal small cyst



MAGNETIC RESONANCE IMAGING

CASE REPORT

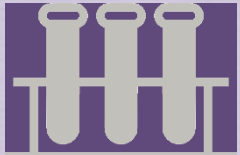


Multilocular mass of her left ovary, which showed diffusion restriction and hypointensity at the T2-weighted sequence.

The right ovary consisted of a solid mass with cystic components and demonstrated a weakly hyperintense signal.

The absence of peritoneal carcinomatosis was confirmed.

CASE REPORT



CA125 level was of **184 U/ ml**
CEA, CA 19.9 and CA 15.3 were within normal limits

Counselling: immediate surgery to obtain a histological diagnosis or surgery at 13 wks gestation.

She refused surgery and decided to wait until pregnancy was more advanced.



CASE REPORT

10 w

Both adnexal masses had characteristics similar to those at initial presentation



Left 114x65mm



Right 83x51x60 mm



CASE REPORT

12 w

Both adnexal masses had characteristics similar to those at initial presentation



Left mm 107x78



Right mm 90x42



CASE REPORT

13 w

SURGERY



Laparotomy: left ovarian cystectomy without tumor spillage and a right salpingo-oophorectomy

Frozen section from the left ovarian capsule was positive for **micropapillary borderline tumor**



HISTOLOGY

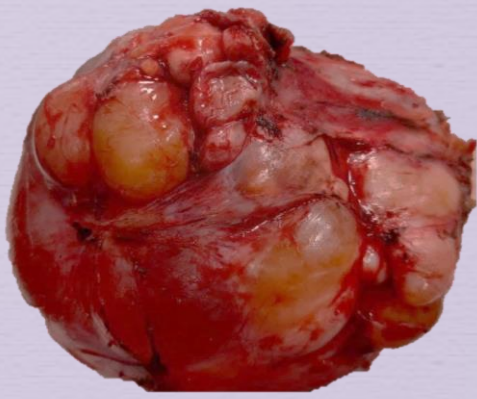
CASE REPORT



Left mm 107x78



Right mm 90x42



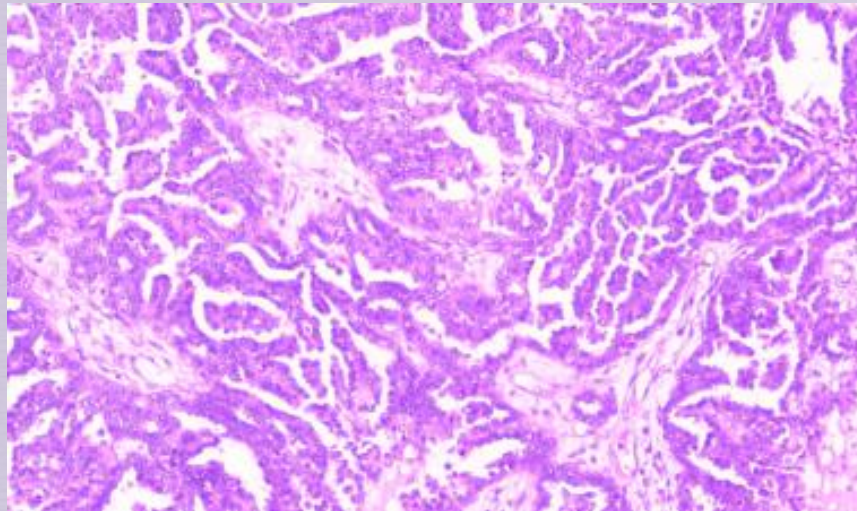
HISTOLOGY

CASE REPORT

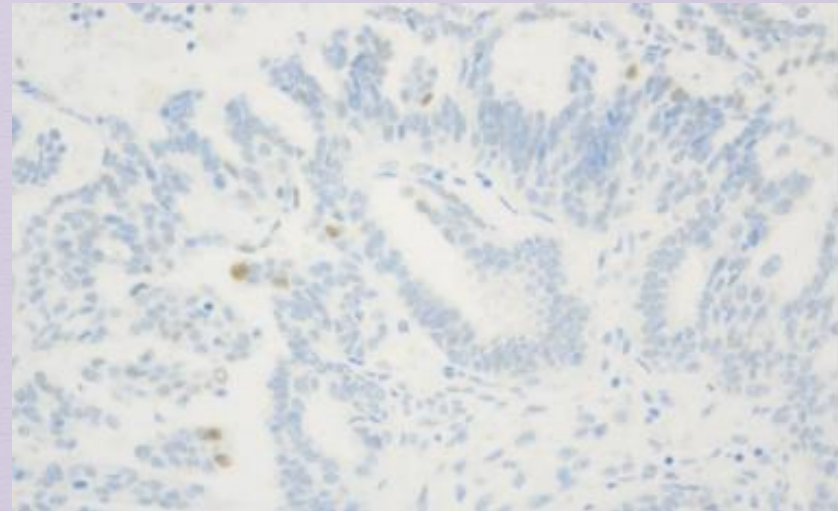
Final histology report was positive for



Low-grade serous carcinoma in both ovaries and in the biopsy taken from the right hemidiaphragm— FIGO stage IIIC



Mild cytological atypia and low mitotic index



Focal staining pattern indicative of p53 wild type

CASE REPORT

TREATMENT

Neoadjuvant chemotherapy with carboplatin AUC4 and paclitaxel 75 mg/m² (5 cycles)

35 w

Elective caesarean section was performed via an abdominal midline incision

Hysterectomy, left salpingo-oophorectomy, infragastric omentectomy, splenectomy, resection of bulky bilateral pelvic lymph nodes, and peritoneal stripping of the right paracolic gutter, Morrison's pouch, and right hemidiaphragm were performed (confirmation of "low grade serous carcinoma"- peritoneum, lymph nodes, omentum, spleen)

The patient is free of disease at 8 months from surgery
Therapy with Letrozole 2,5 mg is ongoing

WHAT CAN WE STILL LEARN?



How is the prevalence of invasive cancer in unilocular solid cysts?

How to manage a suspicion of cancer at the very beginning of pregnancy?



How to diagnose a multilocular cyst during pregnancy?

What is the accuracy of IOTA Model during pregnancy?

What can we still learn?



How is the prevalence of invasive cancer in unilocular solid cysts?

How to diagnose a multilocular cyst during pregnancy?

What is the accuracy of IOTA Model during pregnancy?



**Multilocular
tumors**

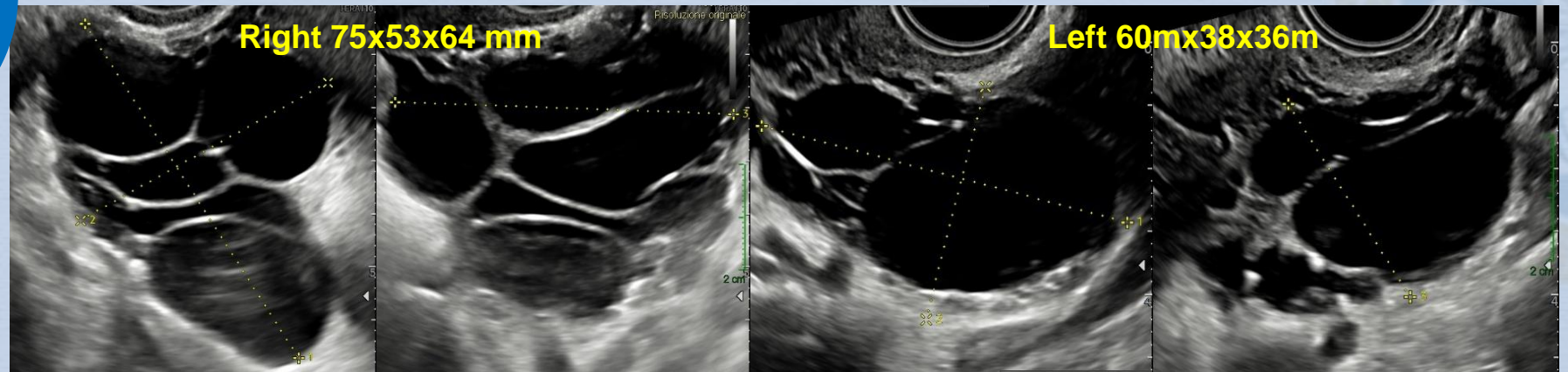
- Ovarian hyperstimulation
- Cystadenoma
- Cystadenofibroma
- Metastases

CLINICAL CASE

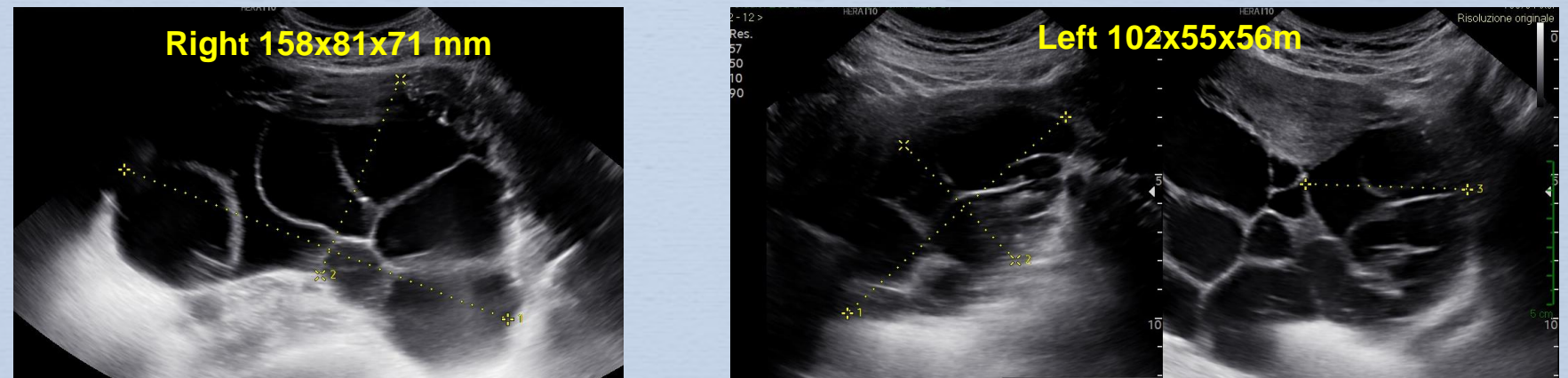


C.S:
33 years old
Nulliparous

12 weeks

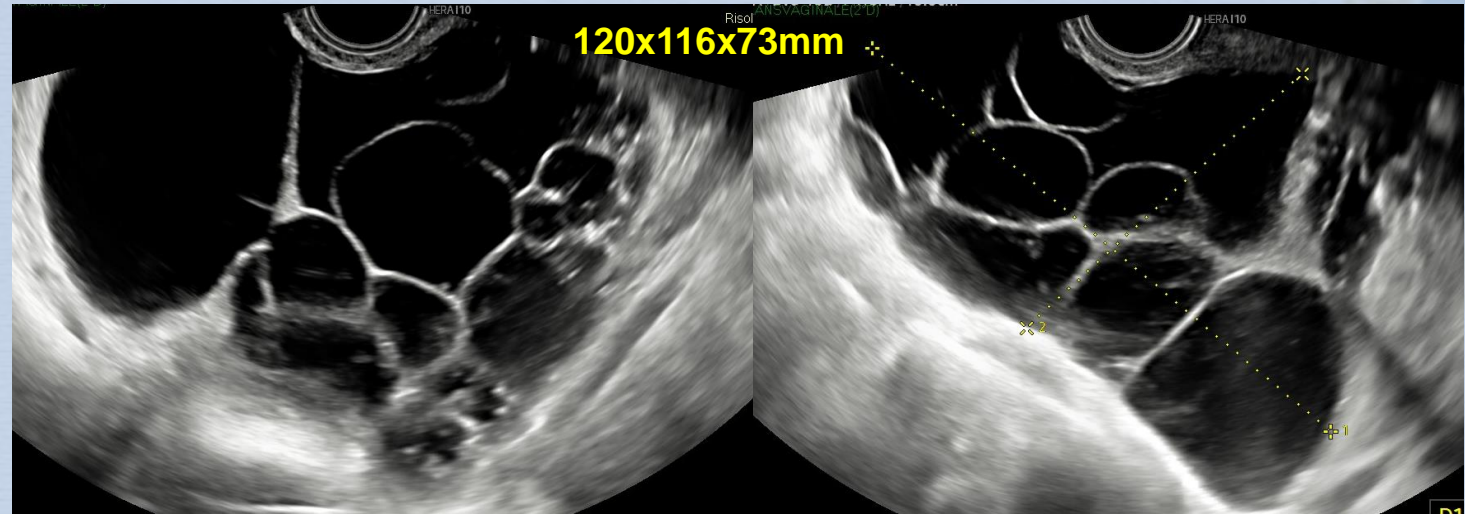


24 weeks

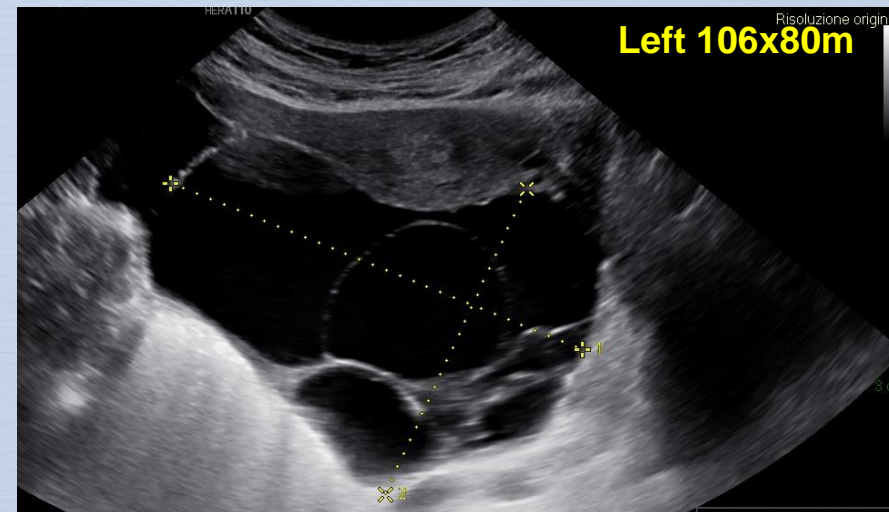
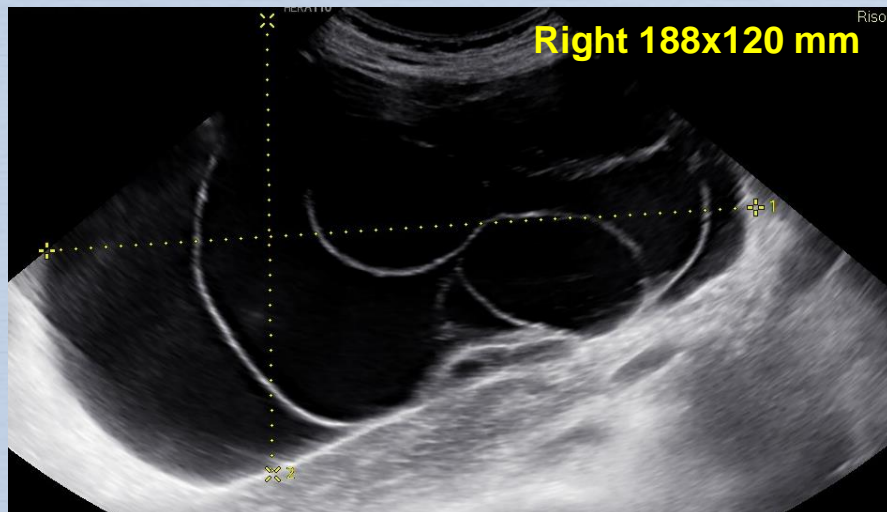


CLINICAL CASE

29 weeks

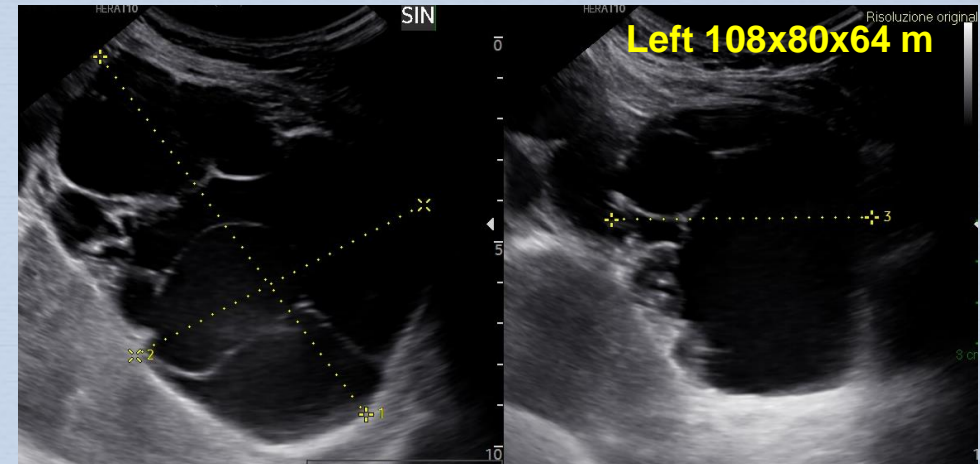
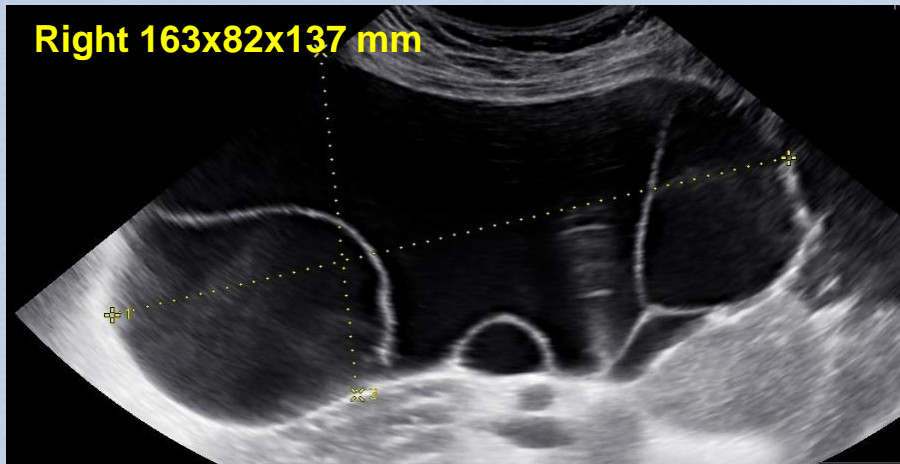


33 weeks



CLINICAL CASE

Post partum



At six months follow-up (ultrasound examination performed at another institution) bilateral multilocular lesions. Hypothesis of cystadenomas.

WHAT CAN WE STILL LEARN?

How is the prevalence of invasive cancer in unilocular solid cysts?

How to manage a suspicion of cancer at the very beginning of pregnancy?

How to diagnose a multilocular cyst during pregnancy?

What is the accuracy of IOTA Model during pregnancy?



A close-up photograph of a pregnant woman's belly and arms, showing her skin tone and the texture of her clothing. The image is positioned on the left side of the slide.

A look to the future...

- Multicentric prospective studies
- Predictive performance of IOTA models in pregnancy (ADNEX, Simple Rules)
- Artificial intelligence and Radiomics

IOTA Pregnancy



Thank you

